Rev. 2/06		Bridge No.	
		Job No.	

Missouri Department of Transportation

Culvert Hydraulics Report

Designer			Date	
Route		County		Stream

Purpose of Hydraulic Study

(write a brief statement describing project and purpose of hydraulic study)

National Flood Insurance Program Information

Has a flood insurance study been performed for the community? *(www.fema.gov/home/fema/csb.htm)*	
Is the culvert in a special flood hazard area? *(If yes, a floodplain development permit will be required)*	
Is the culvert in a designated floodway? *(If yes, a no-rise certification will be required)*	
Has a Flood Insurance Rate Map (FIRM) been published for the area?	
What is the insurance rating for the site (A1, B, C, etc.)?	

Base (100-yr) Flood Elevation		Floodway width	
Map panel number		Map date	

Additional comments on Flood Insurance Study:

Discharge Data

Drainage Area		(mi^2)	

Avg. slope between points 10% and 85% of valley length upstream		(ft/mi)

Method of Analysis (choose one or more)		Q_{25}	Q_{50}	Q_{100}	Q_{500}	Use
Missouri Rural USGS regression equations	Region =					☐
Missouri Urban (BDF) regression equations	BDF =					☐
Missouri Urban (%I) regression equations	% Impervious Area =					☐
Stream Gage	USGS Station Number =					☐
FEMA Flood Insurance Study	Community Name =					☐
Other	(Describe method)					

Comments on Discharge calculations: *(method chosen and why, expected level of upstream development, etc.*

Observed Extreme High Water

Elevation		(ft)	Location		Date	

Comments on Observed Extreme High Water: *(discharge, if known, etc.)*

Discuss flow conditions in reach and describe any existing conditions that may influence hydraulic behavior in reach:

Model used:

☐ HY-8	☐ Other (describe)	
☐ River Analysis System (HEC-RAS)		

Model data:

Streambed Slope =		(ft/ft)

How was streambed slope determined?

Which cross section was used to determine high water surface elevations and why?

Which cross section was used to determine tailwater elevations and why?

Describe the channel/overbank conditions and the roughness coefficients chosen:

Culvert Geometry

Inlet Flowline Elevation			Outlet Flowline Elevation		

Span		(ft)	Rise		(ft)	Number of Barrels		Length (headwall to headwall)		(ft)

Additional comments on Culvert Geometry:

Inlet configuration

☐ Straight Wings	☐ Flared Wings	☐ Improved Inlet (describe)	

Additional Comments on Inlet Configuration:

Filenames

Describe files used in culvert calculations: *(Hy-8 filenames and descriptions, etc.)*

Culvert Calculation Results

Frequency	Existing Conditions				Proposed Conditions			
	Q_{25}	Q_{50}	Q_{100}	Q_{500}	Q_{25}	Q_{50}	Q_{100}	Q_{500}
High Water Surface Elevation at Culvert (ft)								
Allowable Headwater Elevation (ft)								
Backwater (ft)								
Inlet or Outlet Control								
Culvert Outlet Velocity (ft/s)								
Tailwater Depth (ft)								
Tailwater Velocity (ft/s)								
% of flow overtopping road								

Additional comments on culvert calculations: *(backwater, velocities, unusual conditions, comparison to observed high water data, etc.*

Scour Protection Measures

General Scour Information: *(Describe soil conditions in streambed and overbanks:)*

What measures are required to protect against scour?

Additional comments on scour protection:

General Information

Are there any improvements/buildings/crops/livestock that might be affected by alterations to the floodplain?

(include description and estimated value)

Special Considerations: *(Describe any other special conditions or considerations which affect this project)*

Culvert Layout Summary

Culvert Layout			Skew	
Loading		Roadway Width	Alignment	

Design Exceptions: *(Provide an explanation of any design exceptions requested and approved for this project)*

Hydraulic Analysis Summary

Hydrologic Data
Drainage Area =_____ (sq. mi.)
Design High Water (DHW) Elev. =_____
Design High Water Frequency =_____(year)
Design High Water Discharge =_____(cfs)
Backwater/Base Flood Data (100 year)
High Water Elev. =_____
Design Discharge =_____(cfs)
Estimated Backwater =_____(ft)
Outlet Velocity =_____(ft/s)
Roadway Overtopping
Design Elev. (1' below shoulder) =_____
Design Discharge =_____(cfs)
Design Frequency =_____(year)